

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference K 1022 PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US 03/19495 | International filing date (day/month/year) 20.06.2003 | Priority date (day/month/year) 17.07.2002 |
| International Patent Classification (IPC) or both national classification and IPC B29C33/40 | | |
| Applicant 3M INNOVATIVE PROPERTIES COMPANY et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I Basis of the opinion
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

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| Date of submission of the demand 11.02.2004 | Date of completion of this report 22.10.2004 |
| Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized Officer Alink, M Telephone No. +49 89 2399-6076 |
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/19495**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-20 as originally filed

Claims, Numbers

1-12 received on 19.07.2004 with letter of 19.07.2004 ✓

Drawings, Sheets

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 9-12 |
| | No: Claims | 1-8 |
| Inventive step (IS) | Yes: Claims | 9-12 |
| | No: Claims | 1-8 |
| Industrial applicability (IA) | Yes: Claims | 1-12 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/19495

Section V

1. Reference is made to the following documents:

- D1: WO-A-2004/007166
- D2: PATENT ABSTRACTS OF JAPAN vol. 1997, no. 02, 28 February 1997 (1997-02-28) -& JP 08 273538 A (DAINIPPON PRINTING CO LTD), 18 October 1996 (1996-10-18)
- D3: DOMININGHAUS HANS: "Die Kunststoffe und ihre Eigenschaften" 1992, VDI VERLAG, DÜSSELDORF
- D4: "Permeability of Plastics and Elastomers" 1995, PLASTIC DESIGN LIBRARY

2. The current application is not clear as required by Article 6 PCT for the following reasons.

2.1 Claim 1 searches protection for a flexible mold. It comprises the feature "containing moisture to saturation at a temperature and a relative humidity at the time of use".

The amount of moisture as being referred to in claim 1 is therefore depending on the temperature at which the mold is being used. As a result, it can not be seen whenever a mold containing moisture is observed, whether it complies with said unclear feature, because the fact whether said moisture is on a saturated level, will depend on the temperature and the relative humidity of the use of the mold. The use of the mold can not be a feature of the mould per se. The scope of the protection as searched for in claim 1 is therefore not clear.

2.2 Claim 6, which searches protection for a mold, refers to method steps. For the skilled man, it is not possible to judge while observing the mold, which viscosity the raw material showed at the moment of making said mold.

3. It is noted with reference to paragraph 2 that unclear features cannot be considered to distinguish claimed subject matter and the state of the art. These unclear features are therefore not taken into account for assessing novelty and inventive step.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/19495

3.1 Document D2, which is considered the closest prior art under Rule 64.1 PCT, discloses a flexible mold comprising a support and a molding layer disposed on said support, a surface thereof being provided with a groove pattern having a predetermined shape and a predetermined size.

Document D2 appears to fail disclosing the feature whereby said support is made of a material having a tensile strength of at least 5 kg/mm².

It should be noted however that the preferred embodiment in D2 for layer 2 appears to be PET, for reasons of tensile strength (cf. D2, paragraph 11), this preferred embodiment being equal to the one of the current application (cf. example 1, page 17, line 20 - page 18, line 26).

Furthermore, the specified tensile strength of at least 5kg/mm² appears to be a common value for PET (cf. D3, 81 N/mm² = 8.3 kg/mm², D4, 179 Mpa = 18.3 kg/mm²)

The specified tensile strength range appears to be nothing more than a standard value. D2, since it discloses the use of the same material as the preferred embodiment of the current application, is therefore considered to disclose all the features of claim 1.

The subject matter of claim 1 is therefore not new in the sense of Article 33(2) PCT.

3.2 Document D2, which is considered the closest prior art under Rule 64.1 PCT, discloses a method of manufacturing a microstructure having a projection pattern having a predetermined shape and a predetermined size on a surface of a substrate, comprising the steps of :

- preparing a flexible mold comprising a support, and a molding layer disposed on said support and having a groove pattern having a shape and a size corresponding to those of said projection pattern on a surface thereof;
- arranging a curable molding material between said substrate and a molding layer of said mold and filling said molding material into said groove pattern of said mold;
- curing said molding material and forming a microstructure having said substrate and said projection pattern integrally bonded to said substrate; and
- releasing said microstructure from said mold.

The subject matter of claim 9 differs therefrom in that the support is made of a material having a tensile strength of at least 5 kg/mm² and containing moisture to

saturation at a temperature and a relative humidity at the time of use.

The subject matter of claim 9 is therefore new in the sense of Article 33(2) PCT

The feature that the support is made of a material having a tensile strength of at least 5 kg/mm² appears to be implicitly disclosed by the preferred embodiment of D2 (cf. also paragraph 3.1 and the documents D2, D3 and D4).

The feature "containing moisture to saturation at a temperature and a relative humidity at the time of use" is neither known nor suggested by any of the available prior art under Rule 64.1 PCT. The solution according to claim 9 is therefore considered to be inventive if only the available prior art under Rule 64.1 PCT is taken into account.

4. The following is noted too:

(a) Document D1 is not considered to be comprised in the prior art under Rule 64.1 (a)(b) PCT. It is noted however that upon entering the European phase, D1 will be considered prior art under Article 54(3) EPC.

It appears that document D1 is very relevant prior art (cf. page 8, lines 6 - 10) . Since D1 appears to claim a valid priority, the claimed priority of the current application appears to be not correct. Furthermore, D1 upon entering the regional phase, would be novelty destroying for at least the subject matter of claims 1 and 9.

(b) The features of the claims are not followed by the reference signs relating to said features (Rule 6.2(b) PCT).

(c) Rule 5.1(a) (ii) PCT is not fulfilled since the documents D1 and D2 are not acknowledged in the description.

July 11, 2004

New Claims

~~What is claimed is:~~

1. A flexible mold comprising:
 - a support made of a material having a tensile strength of at least 5 kg/mm² and containing moisture to saturation at a temperature and a relative humidity at the time of use ~~by a moisture absorption treatment applied in advance~~; and
 - a molding layer disposed on said support, a surface thereof being provided with a groove pattern having a predetermined shape and a predetermined size.
2. A flexible mold as defined in claim 1, wherein said support and said molding layer are transparent.
3. A flexible mold as defined in claim 1 or 2, wherein said support is a film of a hygroscopic plastic material.
4. A flexible mold as defined in claim 3, wherein said hygroscopic plastic material is at least one kind of plastic material selected from the group consisting of polyethylene terephthalate, polyethylene naphthalate, stretched polypropylene, polycarbonate and triacetate.
5. A flexible mold as defined in any one of claims 1 to 4, wherein said support has a thickness of 0.05 to 0.5 mm.
6. A flexible mold as defined in any one of claims 1 to 5, wherein said molding layer comprises a base layer made of a first curable material having a viscosity of 3,000 to 100,000 cps at 10 to 80°C and a coating layer made of a second curable material having a viscosity of not higher than 200 cps at 10 to 80°C, the coating layer being applied over a surface of said molding layer.
7. A flexible mold as defined in claim 6, wherein said first curable material and said second curable material are photo-curable materials.

8. A flexible mold as defined in any one of claims 1 to 7, wherein the groove pattern of said molding layer is a lattice pattern constituted by a plurality of groove portions arranged substantially in parallel while crossing one another with predetermined gaps among them.

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9. A method of manufacturing a microstructure having a projection pattern having a predetermined shape and a predetermined size on a surface of a substrate, comprising the steps of:

providing

10. preparing a flexible mold comprising a support made of a material having a tensile strength of at least 5 kg/mm² and containing moisture to saturation at a temperature and a relative humidity at the time of use by a ~~humidity absorption treatment applied in advance~~ and a molding layer disposed on said support and having a groove pattern having a shape and a size corresponding to those of said projection pattern on a surface thereof;

providing

15. arranging a curable molding material between said substrate and a molding layer of said mold and filling said molding material into said groove pattern of said mold;

curing said molding material and forming a microstructure having said substrate and said projection pattern integrally bonded to said substrate; and releasing said microstructure from said mold.

20. 10. A manufacturing method as defined in claim 9, wherein said molding material is a photo-curable material.

11. A manufacturing method as defined in claim 9 or 10, wherein said microstructure is a back plate for a plasma display panel.

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12. A manufacturing method as defined in claim 11, which further comprises a step of independently arranging a set of address electrodes substantially in parallel with each other while keeping a predetermined gap between them on a surface of said substrate.